

**Navigation Improvement Study of  
the  
Upper Mississippi River Near  
Savanna Bay, Pool 13**

**Sedimentation and Hydrodynamic  
Investigation**

**Volume 2 of 2**

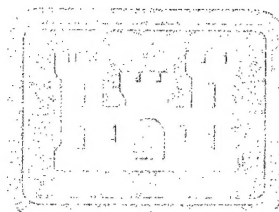
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**US Army Corps  
of Engineers**

ILLINOIS  
Carroll County

2 298 000 E

Savanna Bay

2 296 000 E

Mississippi Palisades State Park

Sweeney  
Islands

Island 266

Boy Scout Island

IOWA  
Jackson County

Dike 539.2R

Sabula Slough

1 990 000 N

EL: 10  
EL: 0  
EL: -10  
EL: -20  
EL: -30

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL



U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

PREPARED BY: C. MATHES  
DRAWN BY: C. MATHES  
CHECKED BY: R. DAVENRY

SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
1996 PROTOTYPE SURVEY

800 400 0 800 FT

GRAPHIC SCALE: 1" = 800'  
DATE: 10/96  
PLATE NO.

20

ILLINOIS

Carroll County

Savanna Bay

Island 266

Sweeney Islands

Dike 539.2R

Sabula Slough

IOWA  
Jackson County

Santa Fe Island

Riprap Island

1988 000 N

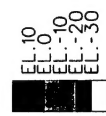
Dike 540.9R

Dike 540.8R

Dike 540.7R

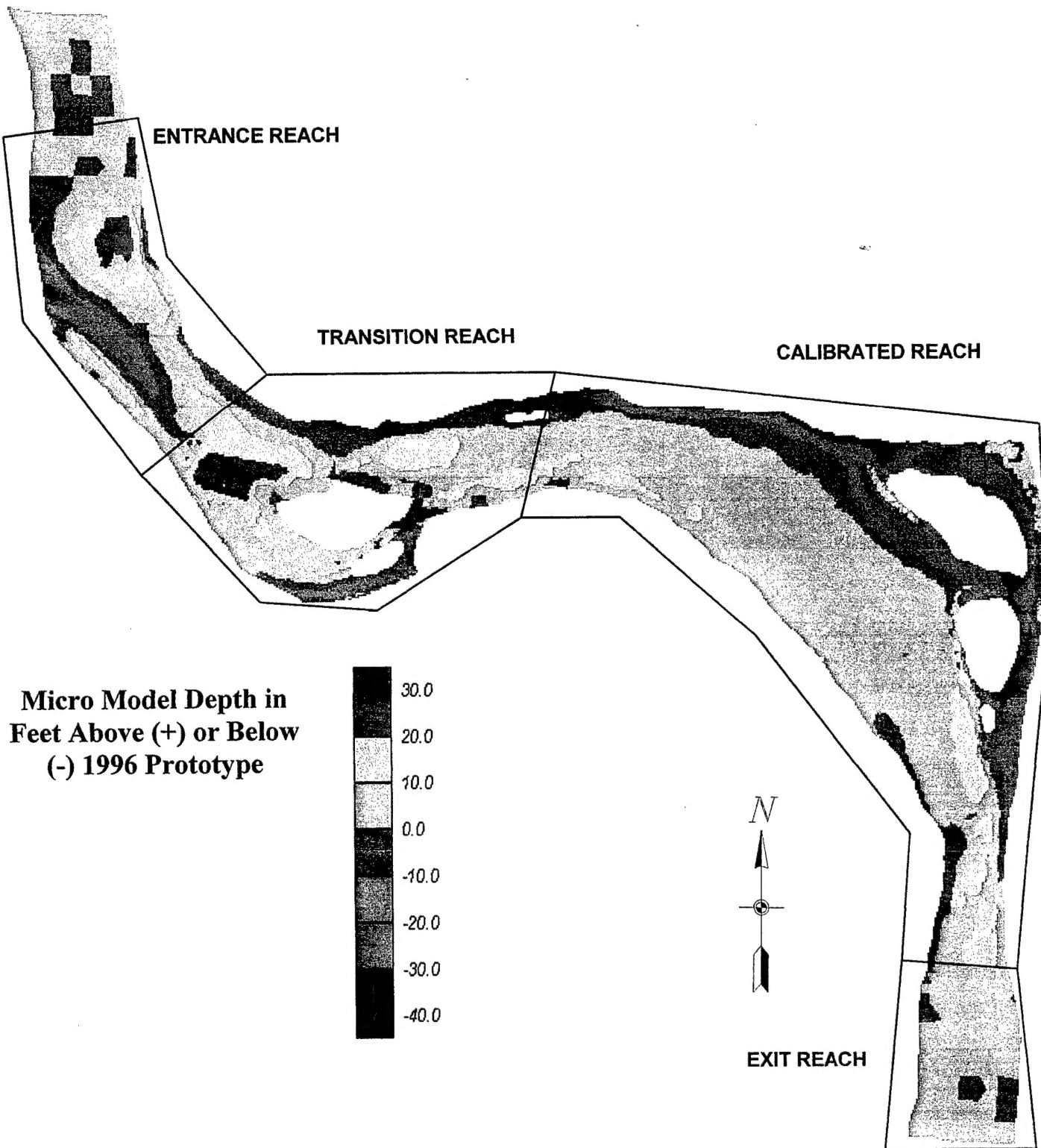
1986 000 N


1984 000 N



ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

	U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS	
	SAVANNA BAY MICRO MODEL STUDY MISSISSIPPI RIVER MILES 542-537	
PREPARED BY: C. MATHES DRAWN BY: C. MATHES BY: R. DAVENPORT	BASE TEST 800 400 0 800 FT FOOT SCALE 1" = 400'	PLATE NO. <b>21</b>



	<b>U.S ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS</b>
PREPARED BY: T. Wicong CHECKED BY: R. Devivoy	Navigation Improvement Study of the Upper Mississippi River Near Savanna Bay, Pool 13  <u>Comparison of Prototype Bathymetry Versus Micro Model Bathymetry</u>
	PLATE NO. <b>22</b>





Sabula Slough

N

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ROCK ISLAND, ILLINOIS

SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538

BASE TEST

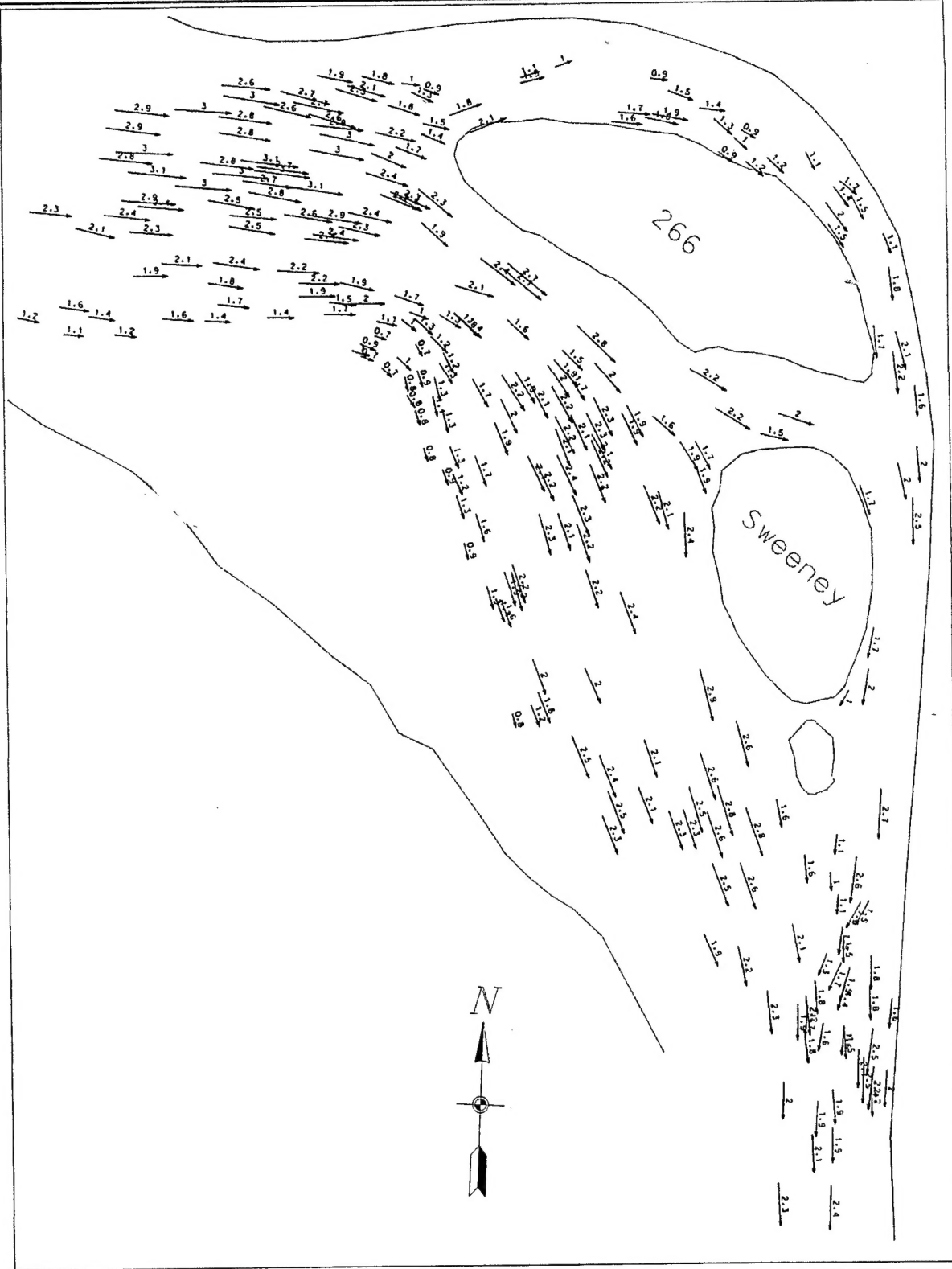
800 400 0 800 F.T.

DESIGN: L.C. Sweeney Bay  
PLOT SCALE: 1" = 800'

PLATE NO. **23**

EL. 10  
EL. 0  
EL. -10  
EL. -20  
EL. -30

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL



PREPARED BY: C. Mathes  
CHECKED BY: R. Dakevay

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ROCK ISLAND, ILLINOIS**

**Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13**

**Base Test  
Micro Model Flow Visualization Velocity Diagram**

PLATE NO.

**24**



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SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE ONE  
CLOSURE STRUCTURES

800 400 0 800 FT

DESIGN FILE: SAVANNAH BAY  
PLOT SCALE: 1" = 800'

PLATE NO. **25**

PREPARED BY: C. MATHES  
DRAWN BY: C. MATHES  
CHECKED BY: R. DAVENPORT



ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL









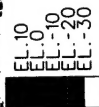
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ROCK ISLAND, ILLINOIS

SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE FOUR  
OPTION TWO WITH WINGDAUS

800 400 0 800 FT

DESIGN FILE: SAVANNAH BAY  
PLOT SCALE: 1" = 800'

PLATE NO. **28**

	ELEVATIONS REFERENCED ABOVE OR BELOW FLAT POOL

PREPARED BY: C. MATHEWS  
DRAWN BY: C. MATHEWS  
CHECKED BY: R. DAVENPORT



EL. 10  
EL. 0  
EL. -10  
EL. -20  
EL. -30

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

PREPARED BY: C. MATHEWS  
DRAWN BY: C. MATHEWS  
CHECKED BY: R. DAWSON



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ROCK ISLAND, ILLINOIS  
SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE FIVE  
WINGDAMS  
800 400 0 800 FT

DESIGN FILE SAVANNAH BAY  
PLAT SCALE 1" = 800'  
PLAT DATE NOV 97  
PLATE NO 29



U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS	
SAVANNA BAY MICRO MODEL STUDY MISSISSIPPI RIVER MILES 540-538 ALTERNATIVE 'SIX' REVETMENT CONNECTOR	
800 400 0	800 FT 0
DRAWN FILE SAVANNA BAY PLOT SCALE 1" = 800'	
PLATE NO. 30	

PREPARED BY: C. MATHES DRAWN BY: C. MATHES CHECKED BY: R. DAVENPORT	
ELEVATIONS REFERENCED ABOVE OR BELOW FLAT POOL	

10 0 -10 -20 -30	
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ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

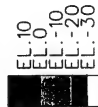
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ROCK ISLAND, ILLINOIS

SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE SEVEN  
STUB DIKE OFF REVETMENT

800 400 0 800 FT

NOT SCALE 1" = 800' HORIZONTAL  
NOT SCALE 1" = 80' VERTICAL

31




Sabula Slough

SWEENEY ISLAND

Island 266

Sweeney Islands

Island 266

	<b>U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND</b> <b>CORPS OF ENGINEERS</b> <b>ROCK ISLAND, ILLINOIS</b>
	SAVANNA BAY MICRO MODEL STUDY MISSISSIPPI RIVER MILES 540-538 ALTERNATIVE EIGHT THREE BAR DIKES
PREPARED BY: C. MATHEWS DRAWN BY: C. MATHEWS CHECKED BY: R. DAVENPORT	800 400 0 800 FT SCALE: 1" = 800'
REGION: ILL. SAVANNA BAY PLAT DATE: NOV 97 PLATE NO. <b>32</b>	

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL



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ROCK ISLAND, ILLINOIS

SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
THREE ALTERNATIVE NINE  
THREE CLOSURE STRUCTURES

800 -400 0 800 FT

DESIGN FILE: SAVANNAH BAY  
PLOT SCALE: 1" = 800'

PLATE NO. 33

PREPARED BY: C. MATHES  
DRAWN BY: C. MATHES  
CHECKED BY: R. DAVENPORT

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

10  
20  
30

Sabula Slough

N



	<b>U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS</b>
	SAVANNAH BAY MICRO MODEL STUDY MISSISSIPPI RIVER MILES 540-538 ALTERNATIVE TEN SECOND CLOSURE FORWARD
800 400 0	800 FT 0
DESIGN FILE: SAVANNAH BAY PROJECT SCALE: 1" = 800'	DATE: NOV 93

	<b>ELEVATIONS REFERENCED ABOVE OR BELOW FLAT POOL</b>
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DESIGN: TAC, SAVANNAH  
 PLOT SCALE: 1" = 800'  
 PLOT DATE: NOV 87  
 PLATE NO: 35

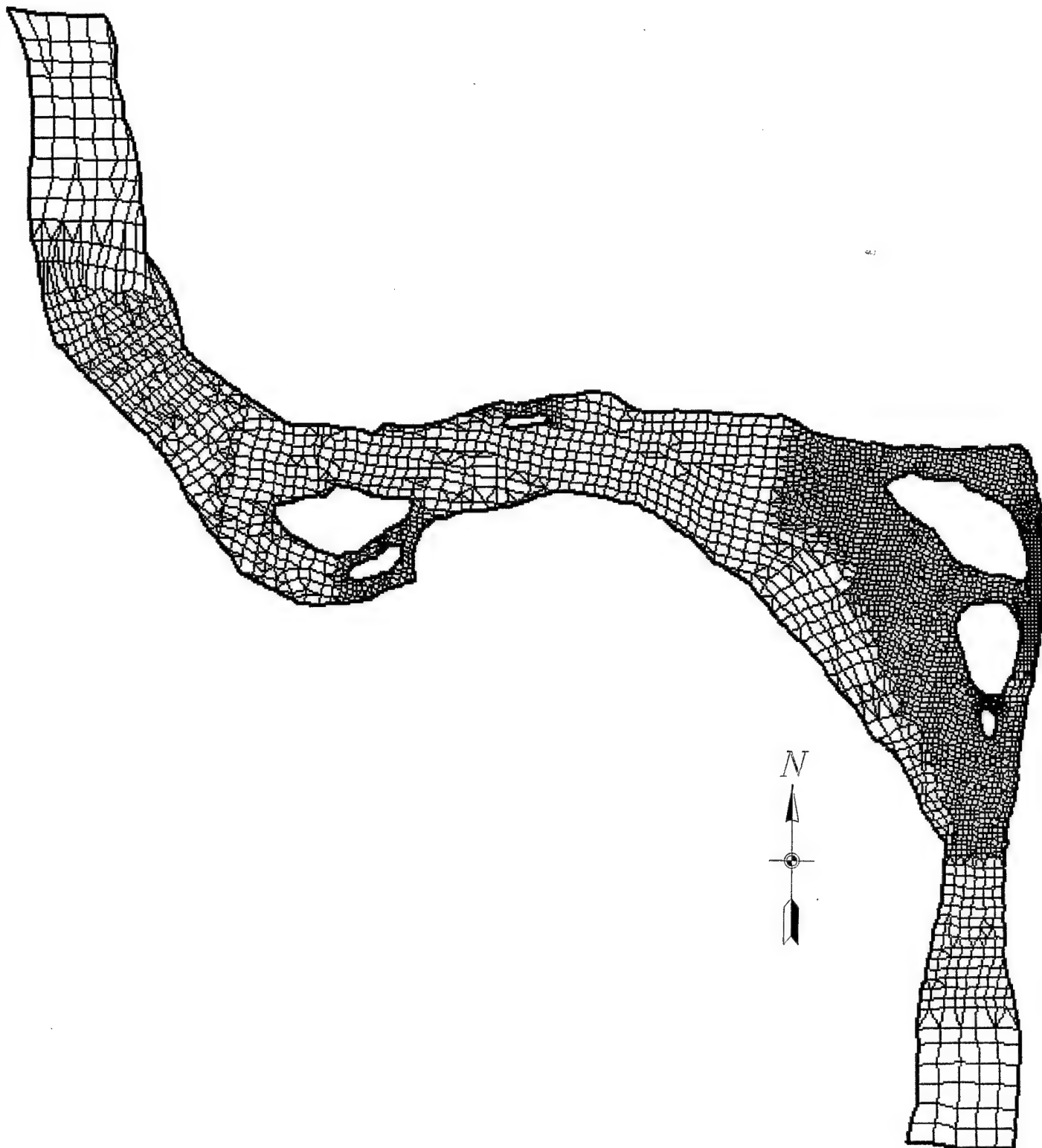
U.S. ARMY ENGINEER DISTRICT ROCK ISLAND  
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 ROCK ISLAND, ILLINOIS

SAVANNAH BAY MICRO MODEL STUDY  
 MISSISSIPPI RIVER MILES 540-538  
 ALTERNATIVE ELEVEN  
 CLOSURE STRUCTURES LOWERED  
 800 400 0 800 FT

PREPARED BY: C. MAYES  
 DRAWN BY: C. MAYES  
 CHECKED BY: R. DAWBNEY

1.10  
1.0  
0  
-10  
-20  
-30

ELEVATIONS REFERENCED ABOVE OR BELOW FLAT POOL



U.S ARMY ENGINEER DISTRICT, ROCK ISLAND  
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ROCK ISLAND, ILLINOIS

PREPARED BY: T. Kirkcaldy  
CHECKED BY: R. Daveroy

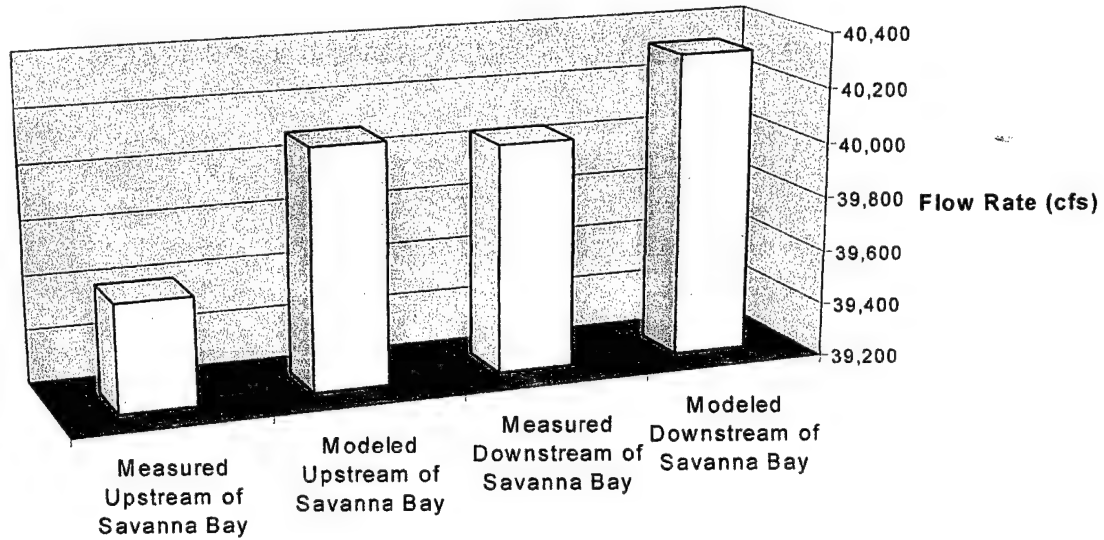
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Finite Element Grid,  
SMS Model

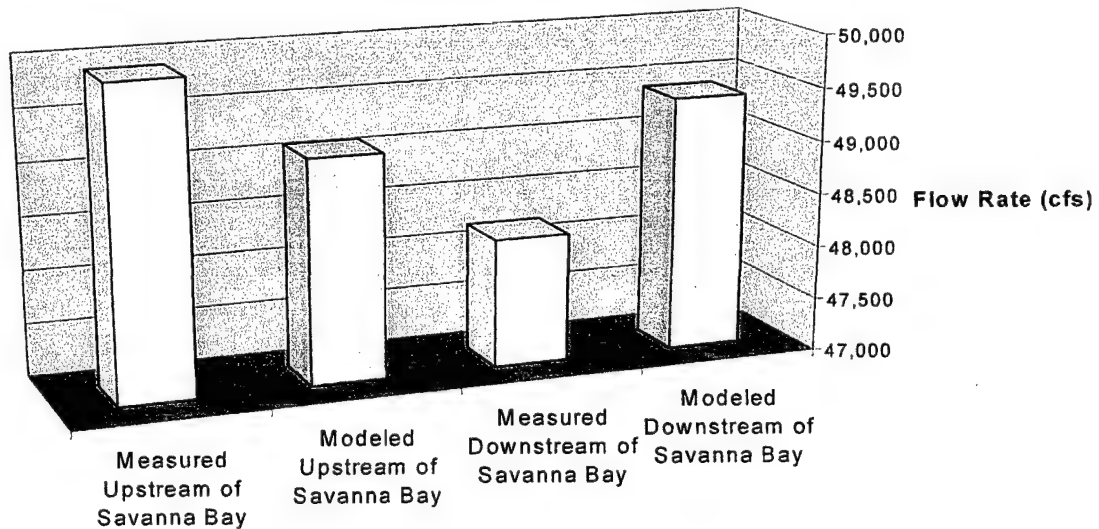
PLATE NO.

**36**

**Main Channel**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Mississippi River, 40,000 cfs



**Main Channel**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Mississippi River, 49,000 cfs



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PREPARED BY: T. Kikoeng  
 CHECKED BY: R. Dawkney

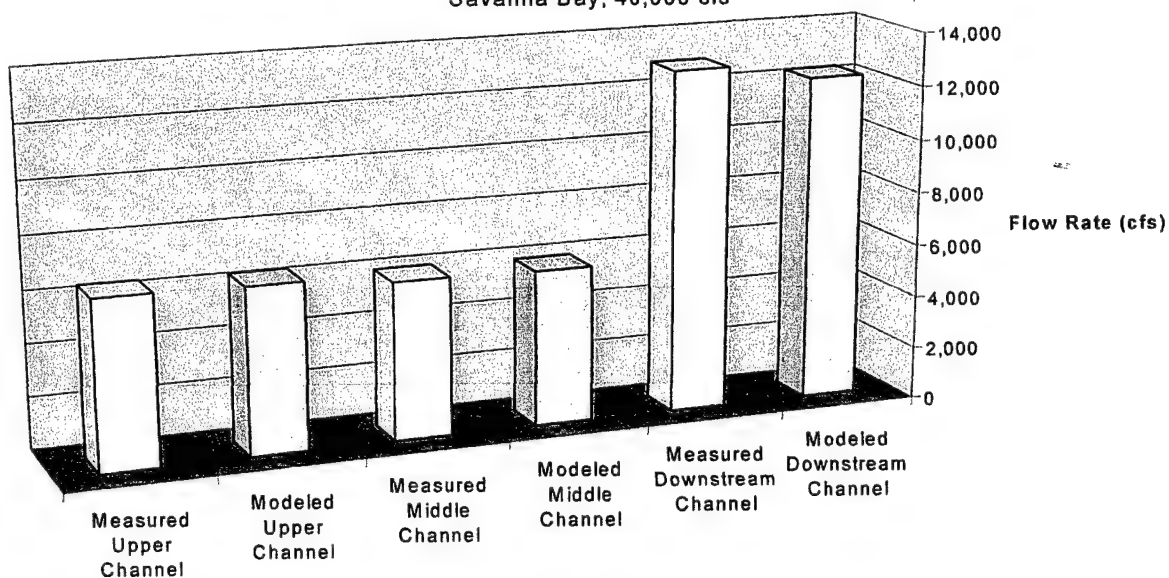
Navigation Improvement Study of the Upper Mississippi  
 River Near Savanna Bay, Pool 13

Main Channel  
Measured Flow vs. SMS Modeling Results

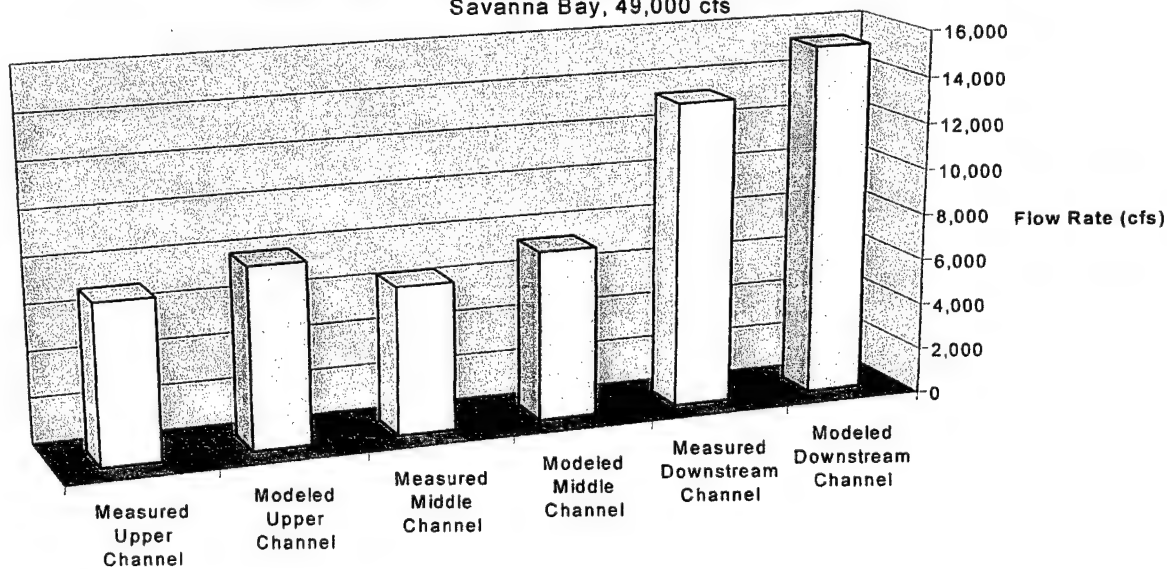
PLATE NO.

**37**

**Side Channel Openings**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Savanna Bay, 40,000 cfs



**Side Channel Openings**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Savanna Bay, 49,000 cfs



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PREPARED BY: T. Kirkceng  
 CHECKED BY: R. Daviney

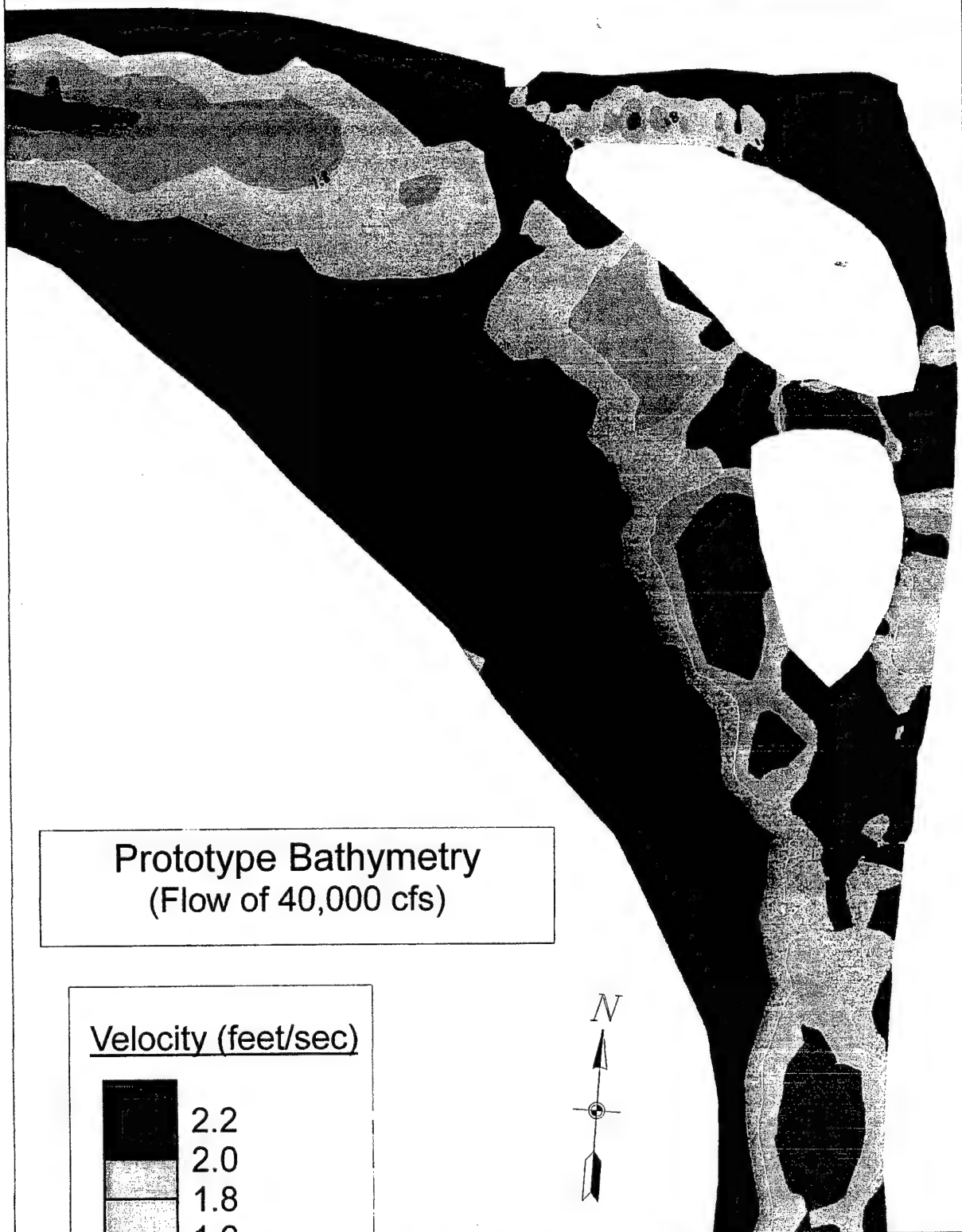
Navigation Improvement Study of the Upper Mississippi  
 River Near Savanna Bay, Pool 13

Side Channel Openings  
Measured Flow vs. SMS Modeling Results

PLATE NO.

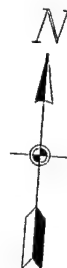
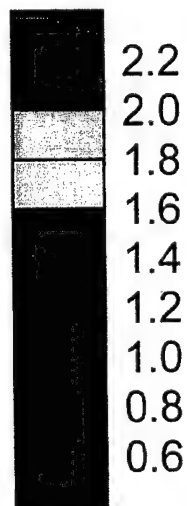
**38**





**Prototype Bathymetry**  
(Flow of 40,000 cfs)

Velocity (feet/sec)



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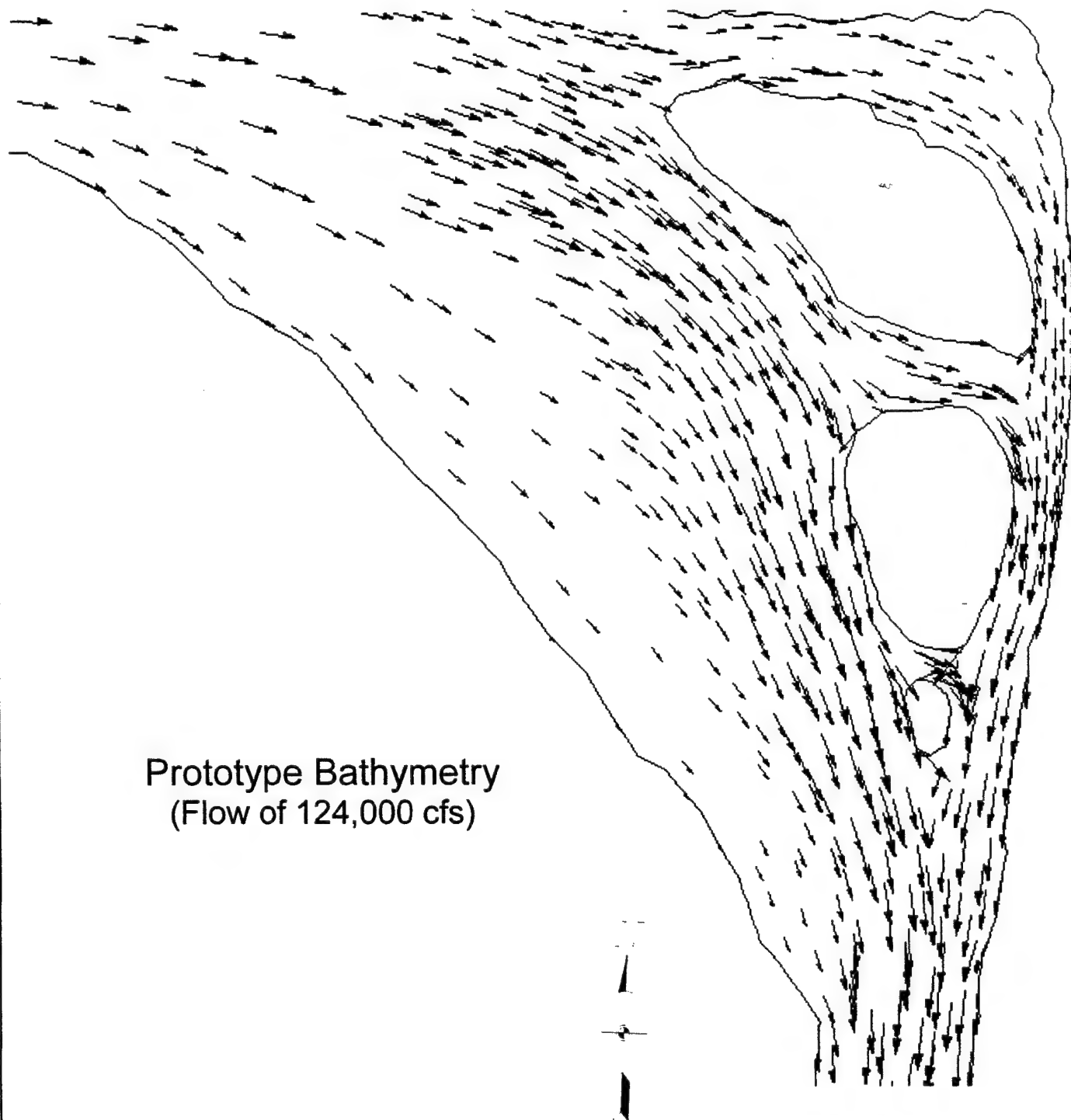
PREPARED BY: T. Kikeeng  
CHECKED BY: R. Devroy

**Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13**

Plan View of Depth Averaged Velocity Contours,  
SMS Model

PLATE NO.

**39**



Prototype Bathymetry  
(Flow of 124,000 cfs)

Vector Velocity Scale:



5 feet/sec



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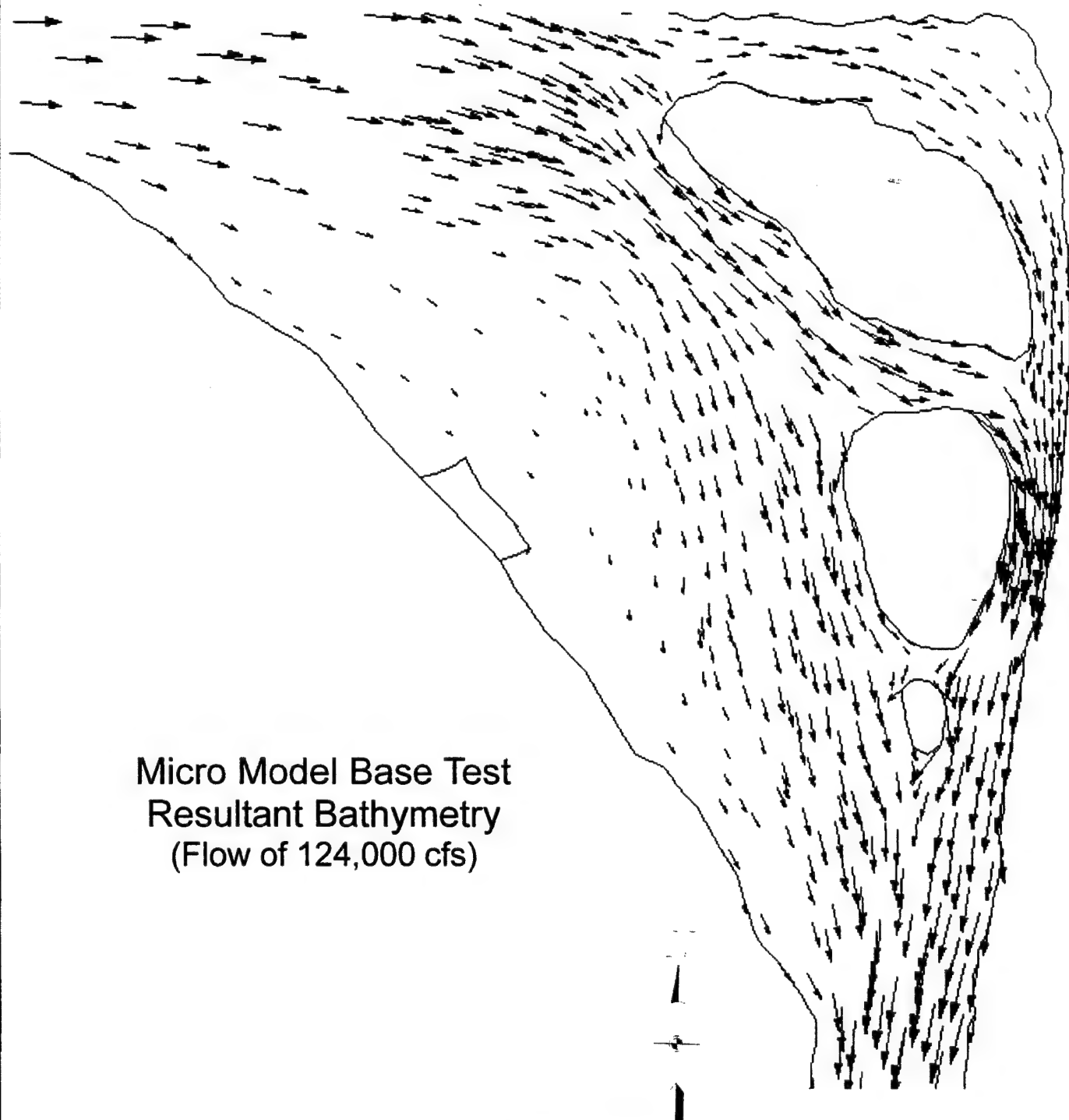
PREPARED BY: T. Kakeong  
CHECKED BY: R. Daveroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

40



Micro Model Base Test  
Resultant Bathymetry  
(Flow of 124,000 cfs)

Vector Velocity Scale:  
→  
5 feet/sec



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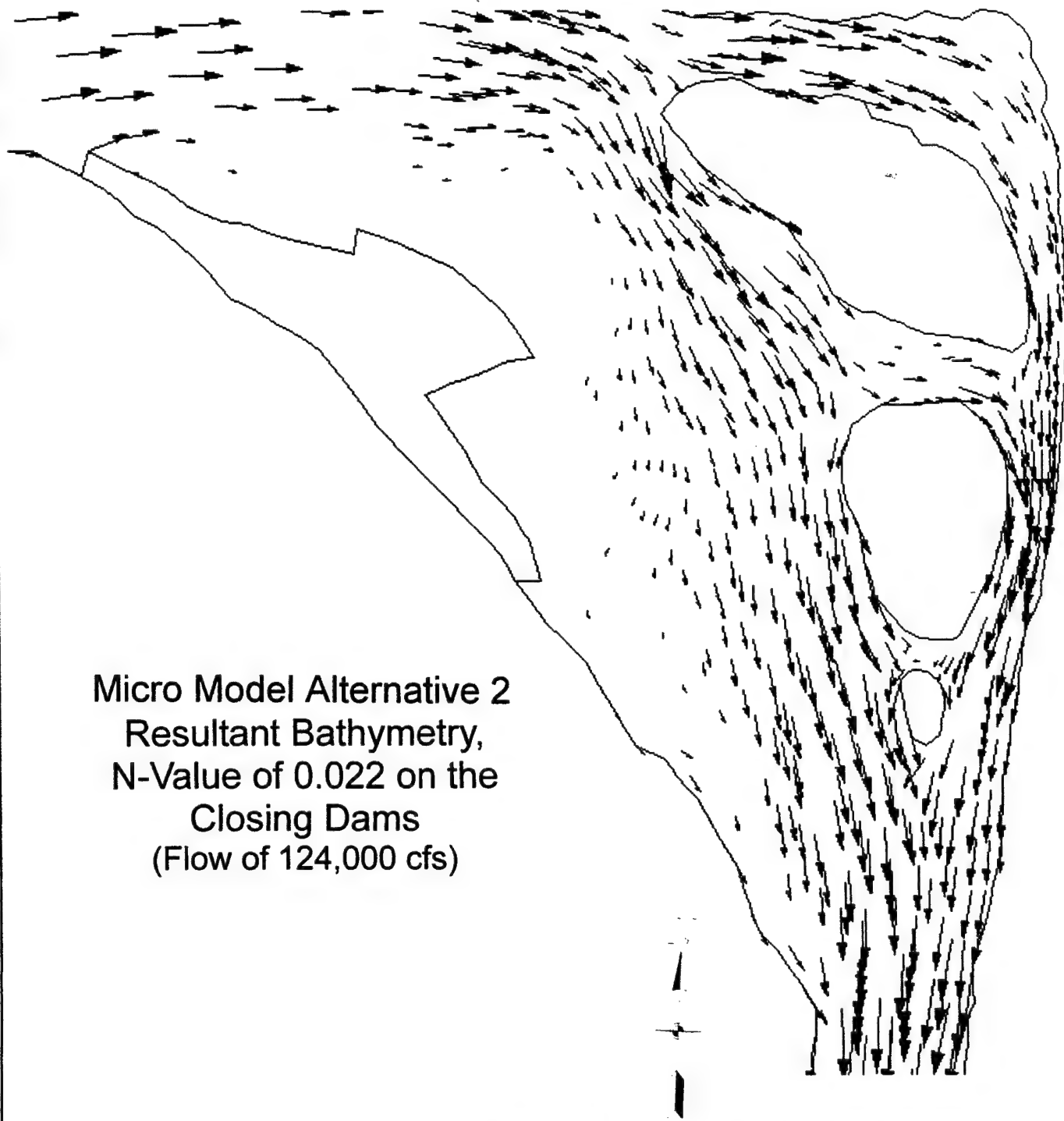
PREPARED BY: T. Kulkarni  
CHECKED BY: R. Denviray

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

**41**



Micro Model Alternative 2  
Resultant Bathymetry,  
N-Value of 0.022 on the  
Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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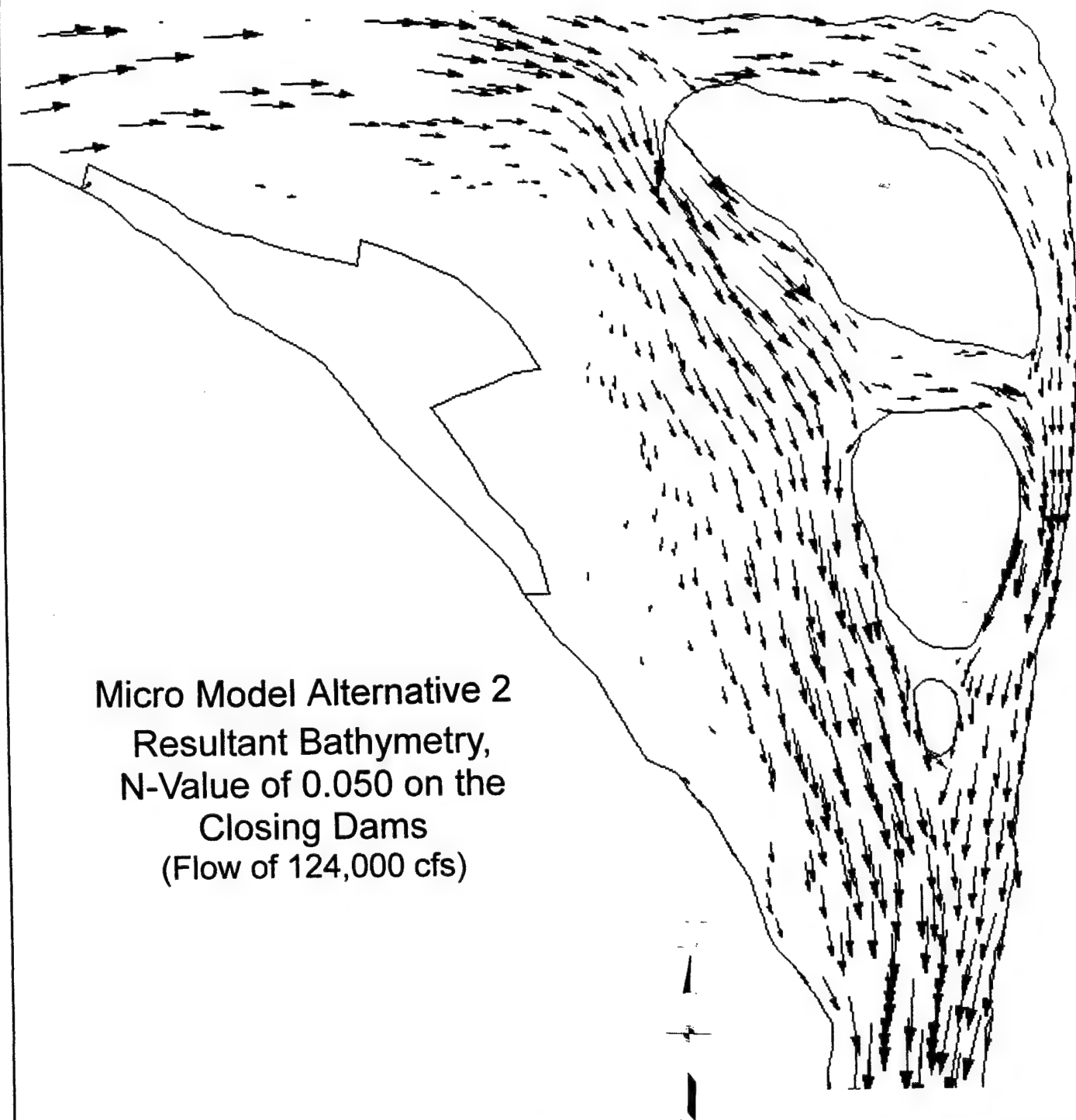
PREPARED BY: T. Kulseng  
CHECKED BY: R. Dewar

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

42



Micro Model Alternative 2  
Resultant Bathymetry,  
N-Value of 0.050 on the  
Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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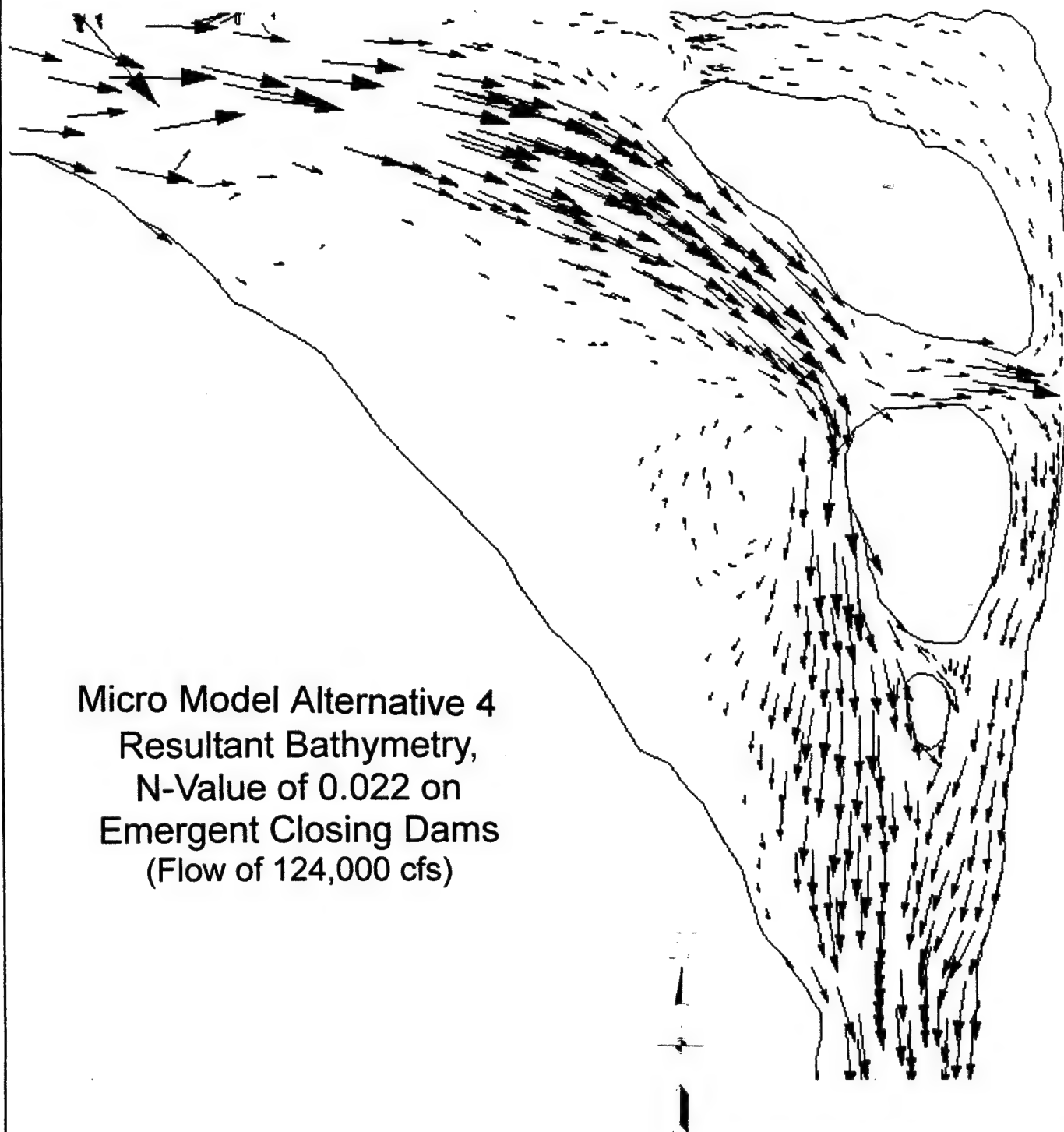
PREPARED BY: T. Kirkseong  
CHECKED BY: R. Dewdney

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

**43**



Micro Model Alternative 4  
Resultant Bathymetry,  
N-Value of 0.022 on  
Emergent Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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PREPARED BY: T. Kriessing  
CHECKED BY: R. Deveney

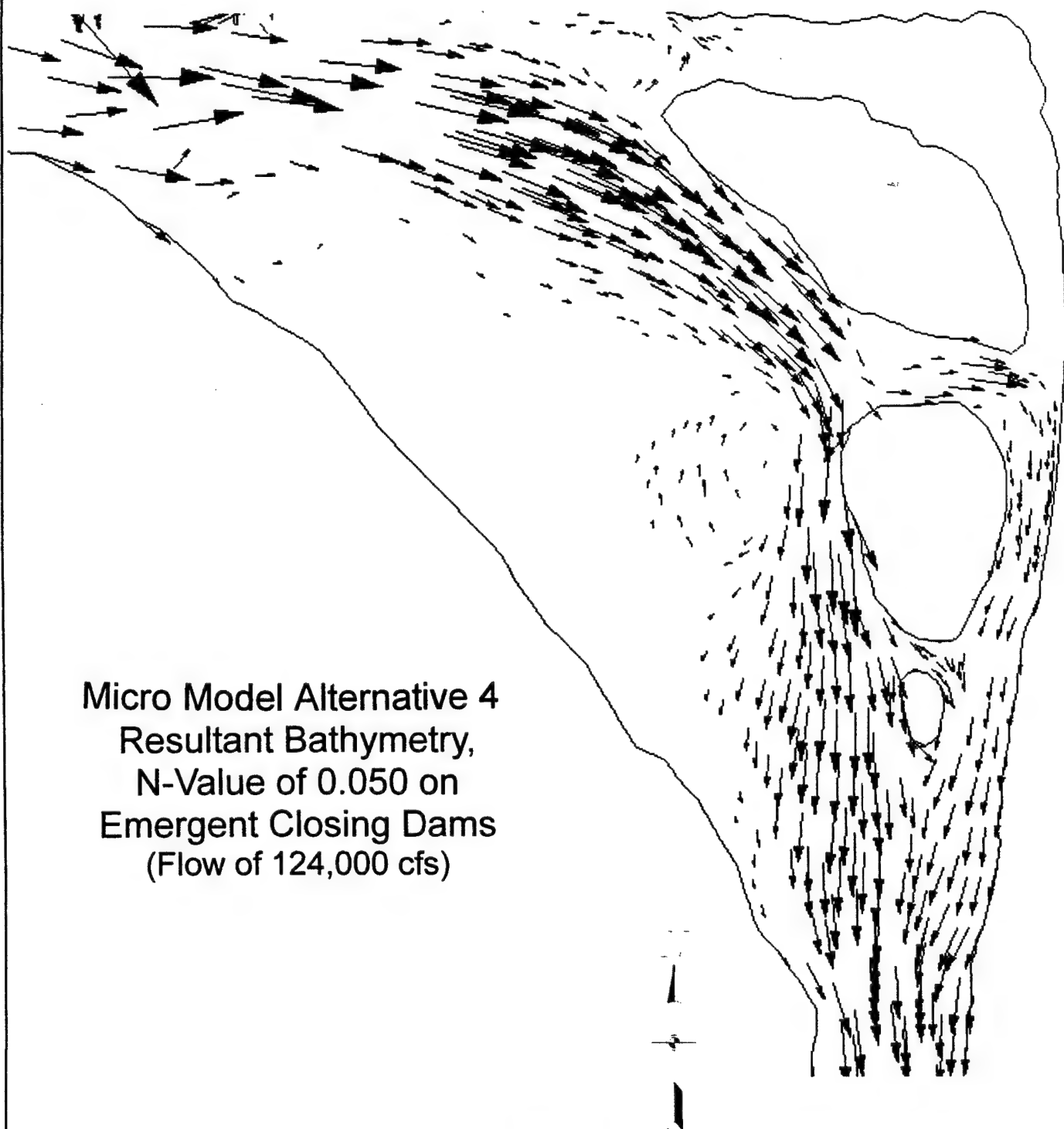
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

**44**





Micro Model Alternative 4  
Resultant Bathymetry,  
N-Value of 0.050 on  
Emergent Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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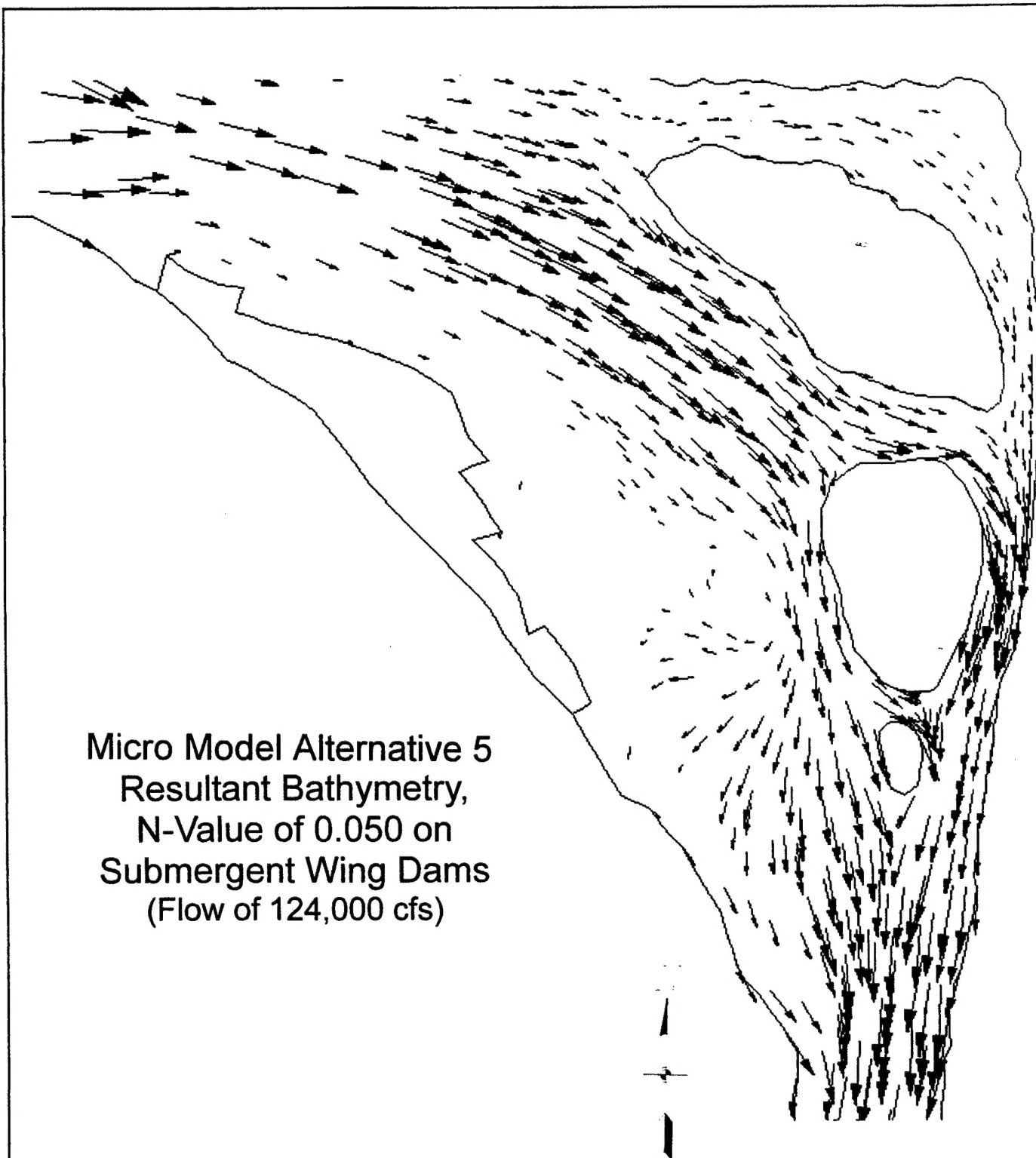
PREPARED BY: T. Kirsavong  
CHECKED BY: R. Denny

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

45



Micro Model Alternative 5  
Resultant Bathymetry,  
N-Value of 0.050 on  
Submergent Wing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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ROCK ISLAND, ILLINOIS

PREPARED BY: T. Kulaeng  
CHECKED BY: R. Daveroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

46

Micro Model Alternative 5  
Resultant Bathymetry,  
Option Includes the Third  
Opening into the Side Channel  
Totally Blocked  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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CHECKED BY: R. Dewdney

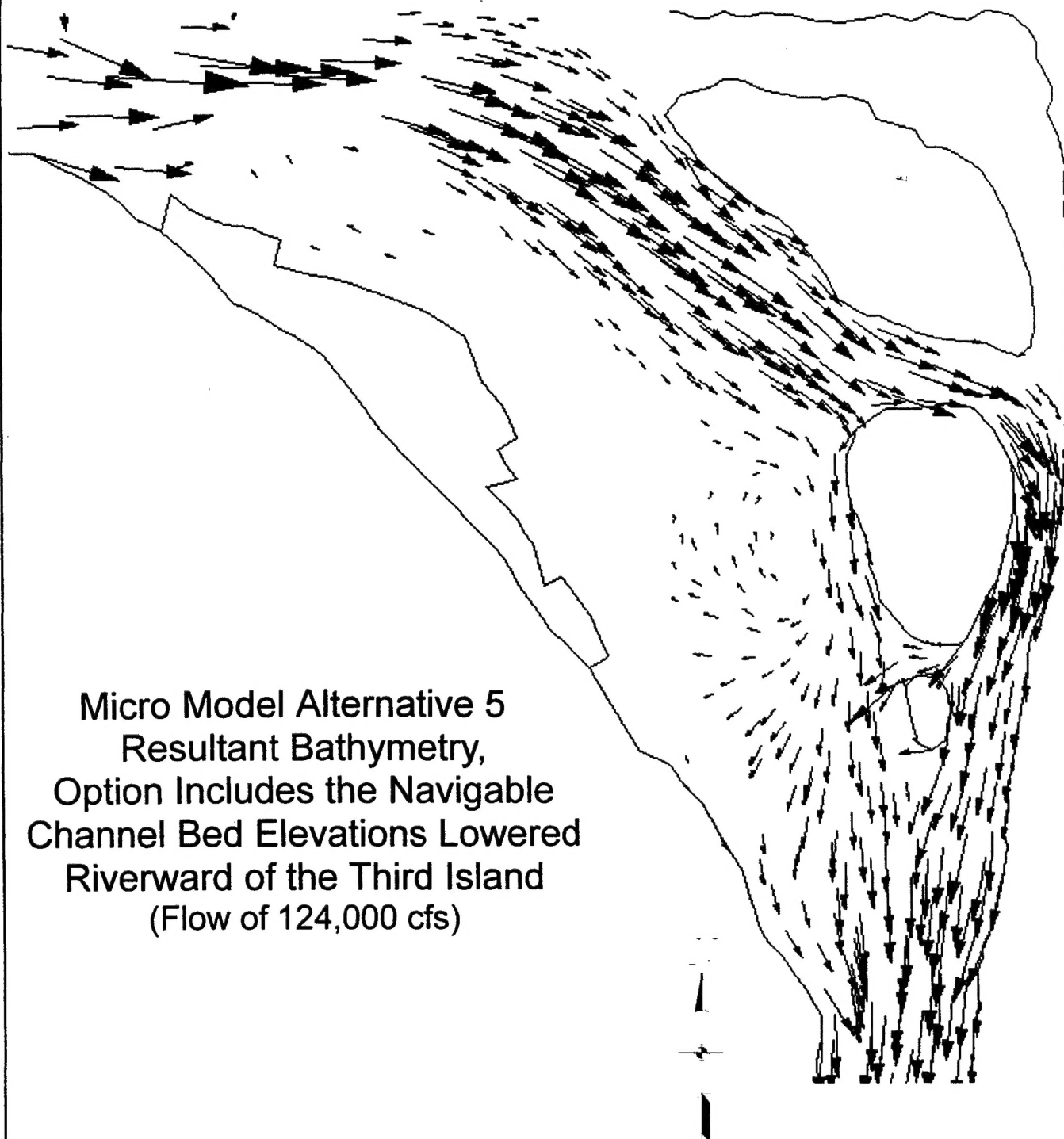
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

47

Micro Model Alternative 5  
 Resultant Bathymetry,  
 Option Includes the Navigable  
 Channel Bed Elevations Lowered  
 Riverward of the Third Island  
 (Flow of 124,000 cfs)



Vector Velocity Scale:  
 →  
 5 feet/sec



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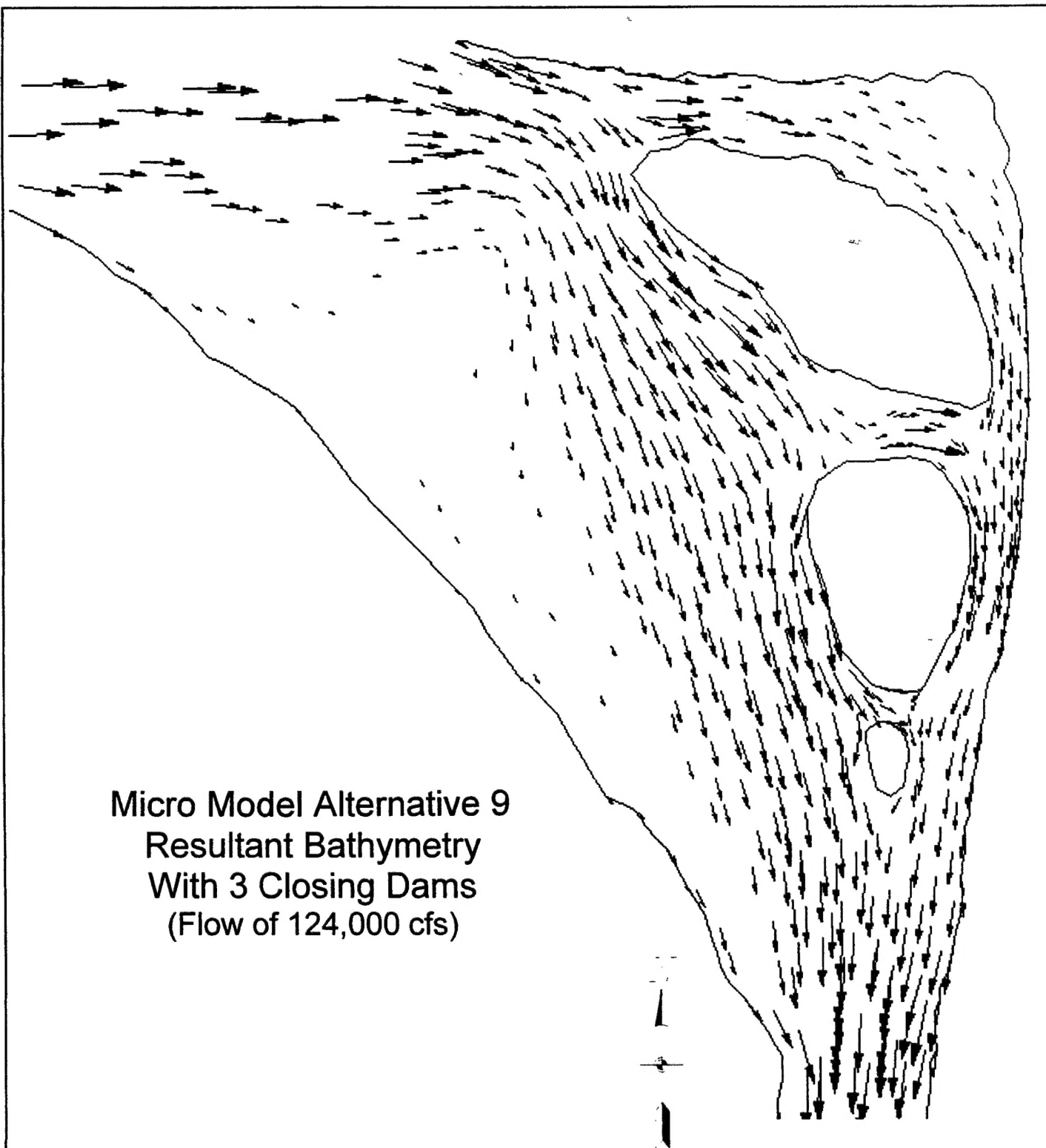
PREPARED BY: T. Krause  
 CHECKED BY: R. Dewdney

Navigation Improvement Study of the Upper Mississippi  
 River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

48



Micro Model Alternative 9  
Resultant Bathymetry  
With 3 Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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ROCK ISLAND, ILLINOIS

PREPARED BY: T. Krskaeng  
CHECKED BY: R. Dennyroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

49